The American Horologist

OFFICIAL NATIONAL PUBLICATION

Vol. III JANUARY, 1938 No. 1

THE AMERICAN HOROLOGIST

Official National Publication of the United Horological Association of America, Inc., and Its Affiliates

Published under the direction of the U. H. A. of A., Inc., Executive and Technical Boards by the Roberts Publishing Co.

To inculcate the principles of the U. H. A. of A., fraternal and commercial advancement; to promote the welfare and enhance the betterment of its members; to cultivate good fellowship and a higher degree of knowledge in Horology; to be sent free monthly to all members. National membership, $2.00 per year. Make application to nearest secretary or representative. Addresses can be secured in the NATIONAL AND LOCAL INFORMATION column in this issue.

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18 DOZ. ROLLER JEWELS

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Bot. No.	Diam.	Length	*Quality	Quantity
1	.34	.80	G	1
2	.38	1.00	G	9
3	.39	.80 to 1.00	G	15
4	.40	.80	G	8
5	.43	1.05	G	3
6	.44	.85 to 1.18	G S	58
7	.45	.95 to 1.18	G S	30
8	.46	.75 to .95	G S	6
9	.48	.85 to .95	G	34
10	.50	.85 to .95	G	14
11	.52	.75 to 1.30	G S	30
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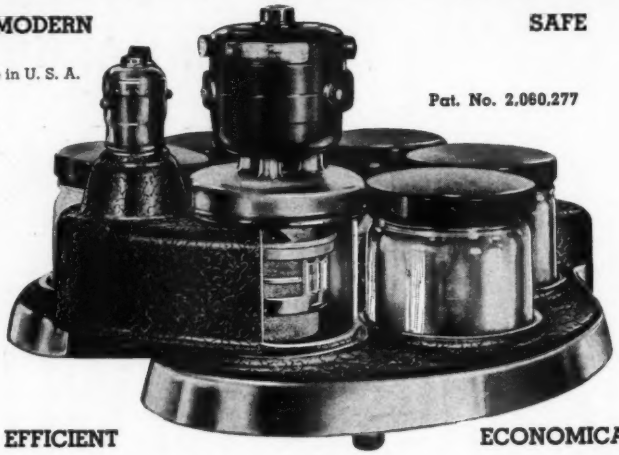

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Our Thanks

TO our many friends, members, associations, non-affiliated associations and those in the industry who have forwarded Season's Greetings, letters and cards of appreciation and encouragement to National Secretary and Association; we truly thank you for all remembrances and kind thoughts expressed in December.

We know you realize the impossibility of our making direct reply to all such letters and cards when hundreds have been sent us. During the past four years in this work it has been our pleasure to hear from our friends regularly, but 1937 over-shadowed previous years.

Your encouragement gives us added hope and a determination to carry on more vigorously in the interest of the trade and primary objectives.

We wish it were possible to transmit in detail all progress being made by U. H. A. A. and its affiliates. However, space will not permit, and although our publication has reflected in minor detail some of our work, it cannot possibly depict the immensity of progress.

One manufacturer expressed our work fairly well when he stated "In all our history we have never seen an association started under such depressing and unfavorable conditions and reach the magnitude of U. H. A. A. Nor have we ever experienced a more determined group in the trade with high ideals and aspirations, a group with limited finances assembled from every section in America.

"In your second year of organization endeavor we were inclined to feel, as many watch makers when they said, 'The U. H. A. of A. is not making fast enough progress.' But after watching you work for four years we, too, have come to realize that the officer personnel knew that mushroom growth and action would not give the desired benefits to a lasting institution. We have noticed the steady progress, increase in membership and activity, and we are proud to be of some value through our cooperation."

In conclusion I again wish to express our thanks to the entire trade and membership, and truly hope that we can—and will—fulfill the expectations of our friends and the trade throughout the country.

Sincerely yours,

ORVILLE R. HAGANS,
National Executive Secretary and Editor.

How to Tell Time in the Dark

"What time is it?"

"I think I can tell you without looking."

He drew out his watch and held it up close to his ear and slowly turned the stem-winder. "One, two, three, four, five, six, seven, eight," he counted, and then said: "That means seventy-two minutes. I wound the watch up tightly at three o'clock, and so the time ought to be about twelve minutes past four. Let's see how near I came to it. Well, it is 4:18—I was only six minutes off."

The other was regarding him with amazement. "Do you mean to say that you can tell the time of day by winding up your watch?"

"Not exactly, but I can come mighty near it; usually within ten minutes, and it's very simple, too. All you have to know is how long one tick in winding up will run the watch. I'll explain to you. Suppose that at three o'clock I wind up my watch until it is tight, as we say; that is, until another turn of the winder would apparently break a spring. At five o'clock I wind the watch again and find that the winder clicks twelve times before the watch is wound up to the place where it sticks. Then you know that twelve clicks will run the watch 120 minutes and that one click represents ten minutes of time."

"What good is it to know that?"

"Well, suppose you go to bed at eleven o'clock tonight, and on retiring wind up your watch and put it under your pillow. During the night you wake up and wonder what time it is. You don't want to get up and turn on the light. All you have to do is to pull that watch out from under the pillow, hold it to your ear, and count the ticks as you wind. If you count eighteen then you know that the watch has run down 180 minutes since eleven o'clock, and that the time must be very near two o'clock. To be sure, you can't tell the

(Concluded on Page 42)

HANSEN UPRIGHTING FACE PLATE

This tool is to be used in connection with the K & D-Hansen Friction Jeweling Tool and fills a want that has been felt by all watchmakers since the introduction of friction jeweling.

The UPRIGHTING FACE PLATE is well made and has self leveling clamps.

Many other uses will be found for this accessory where accurate centering and drilling is required.

$4.75

A watch may be held in a fixed position when the hole has been centered for drilling, reaming, countersinking and for chamfering the edges of the holes and removing burrs left from the reamer, as when fitting friction jewels in low jeweled movements.

In fitting friction jewels it is important that some method be used to keep the holes upright in order that the wheel and pinion depths shall be kept correct.

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No. 3.....¾ to ⅞"
No. 4.....⅝" scant

In handy metal container, with sliding transparent cover.

Price: $1.25

ASSORTMENT No. 544-X96. This larger Assortment contains 96 of the above MALE Adjustable Spring Bars. In handy metal container with sliding transparent cover.

Price: $2.00

ASSORTMENT No. 544F. Contains 18 FEMALE Adjustable Spring Bars in same style metal container with sliding transparent cover.

Price: $1.25

The handy metal containers with sliding transparent covers furnished with the above Assortments are found practical by watchmakers as transparent material containers.

ASSORTMENT No. 664

This Assortment contains 50 Patented MALE Adjustable Spring Bars in FIVE sizes to cover the entire range from ½" to ⅞". THIS ASSORTMENT is similar to No. 544X50, except that it has five sizes; —the additional size being No. 5 which is required for the new cases using ¾" SCANT. Neat cardboard green-covered box with five partitions as shown in illustration.

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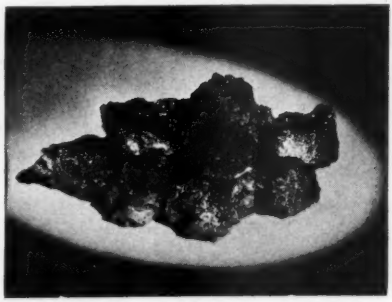
Norbide, A New Abrasive

A NEW abrasive, a rival of diamond powder and economical in use, is now available and a description of it will be of interest to watchmakers and to the jewelry trade in general.

Man is continually trying to outdo Nature—to make products better than she makes them and to develop something new. In one field, however, Nature has not yet been surpassed. The diamond still remains the hardest known substance—still defies successful imitation.



Norton Boron Carbide As It Comes From the Electric Furnace

But man has taken another step forward — has approached Nature closer than ever before. In the Research Laboratories of the Norton Company, Worcester, Mass., there has been developed an entirely new substance, the hardest material ever produced by man for commercial use. The material is known as Norbide.

In grain or powdered form, it is the hardest manufactured abrasive known, doing jobs that have previously been possible only with diamond dust. In molded form it RESISTS abrasion and can be used where an exceedingly hard, smooth surface is desirable.

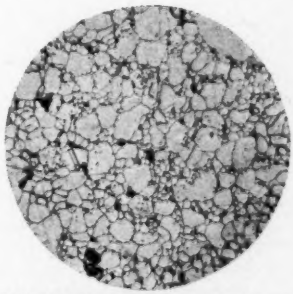
Some experiments have been conducted with molded Norbide as jewels for electrical meters. The results obtained have been only partially satisfactory. This experience is quoted here because of its bearing on the suggestion of the use of Norbide for watch jewels.

The principal objection to molded Norbide for jeweling is in the difficulties encountered in working it into shape and in producing a suitable polish. It is necessary to use diamond powder for the shaping of the jewel using carefully graded sizes of decreasing particle size to develop a smooth surface which may then be polished with fine Crystolon powder.

The development of Norbide was not an accident, but the result of years of careful, painstaking research. The Norton Laboratories have been constantly seeking to develop an abrasive material harder than their silicon carbide (Crystolon) which for over a quarter of a century has ranked next to the diamond for hardness.

The chemical and physical properties of Norbide (B_4C) are extremely interesting. As has been previously stated, its hardness is next to the diamond itself, being considerably greater than that of silicon carbide (SiC), previously considered as second to the diamond.

Of next importance, probably, is the fact that it is self-binding. Under tons of pressure and thousands of degrees of heat, powdered Norbide may be molded without bonds or cementing metals into a homogeneous mass, one-phase crystalline body of accurate dimensions. When



Molded Norbide Specimen—Etched to Show Crystalline Structure—Magnification 150x.

polished, molded Norbide has a hard, smooth, flawless surface that is ideal for many commercial purposes.

Another interesting and exceedingly valuable feature of Norbide is its inertness, or resistance to corrosion. It is unaffected by solutions of acids or alkalies, both concentrated and dilute. Oxidizing acid mixtures are without effect. Moreover, oxidation affects the material but little up to 1000 degrees C. At this temperature the diamond burns completely.

Two Well-known Products, Petroleum Coke and Boric Acid, Are the Raw Materials.

In spite of its hardness, Norbide is lighter than aluminum, its density being 2.52 grams per cubic centimeter. Its coefficient of expansion is 0.0000045 per degree Centigrade, or approximately one-third that of steel. The compressive strength of molded Norbide averages 250,000 pounds per square inch. In cross bending it will develop a modulus of rupture of 40,000 pounds per square inch. Its absolute melting point is 2450 degrees C. (4440 degrees F.). In the type of hardness known as "impact abrasion resistance" Norbide molded products excel all materials.

This new material with such unusual properties is made from two of the most commonplace materials imaginable—carbon, in the form of coke, and boric acid, which is used as an eyewash and for countless other home needs. The magic that transforms these simple materials is heat, the tremendous heat that is created in the electric furnace.

The first step involves the removal of the water of crystallization which accompanies the boric acid crystals. The removal of the water changes the physical character of the boric acid from its powder into that of hard glass, slightly harder than ordinary window glass. Carefully weighed quantities of this anhydrous glass are proportioned with the highest grade petroleum coke. In the furnace of the resistance type, which reaches a temperature approximately 5000 degrees F. (almost twice the melting point of steel) the oxygen is taken away from the glass and carbon substituted. At the very high temperature obtainable only in the electric furnace, the carbide melts and from this melt there are formed crystals of boron carbide-crystals which may serve as an abrasive just as they are taken from the furnace.

Norbide products are marketed in two forms and it is interesting to note that their uses are almost diametrically opposite. In powdered form Norbide is an extremely hard abrasive and is used for many lapping jobs that have previously been possible only with diamond powder. In molded form, on the other hand, it is extremely resistant to abrasion, and is used where an extremely hard, smooth and wear-resisting material is required.

At the present time Norbide is not available in grinding wheels, however, wheels and points made of silicon carbide (Crystolon) of various sizes and shapes are made, this abrasive being next in hardness to Norbide, and will cut anything excepting the diamond and Norbide.

Two tables giving the physical facts about Norbide which we feel will be of interest to the jewelry trade follow.

Table 1—Comparison of Hardness

Moh's Scale	Extension of Moh's Scale	Metal Equivalent
(6) Orthoclase	(6) Orthoclase or Periclase	
	(7) Viterous Pure Silica	
(7) Quartz	(8) Quartz	(8) Stellite
(8) Topaz	(9) Garnet	
	(10) Topaz	
	(11) Fused Zirconia	(11) Tantalum Carbide
(9) Sapphire	(12) Fused Alumina	(12) Tungsten Carbide
	(13) Silicon Carbide	
	(14) Boron Carbide	
(10) Diamond	(15) Diamond	

Table from a paper, "Hardness Values for Electrochemical Products," presented by R. R. Ridgway, A. H. Ballard and B. L. Bailey before The Electrochemical Society, May 1933.

Table 2—Resistance to Compression

Material Tested	Average Modulus of Rupture in Compression	
	lbs./sq. in.	kg./cm.²
Molded B_4C	300,000	20,800
Dense SiC	82,000	5,800
Crystalline Al_2O_3	75,000	5,300
Artificial Ruby	42,000	2,960
Optical Quartz	58,000	4,100
Spark Plug Porcelain	72,000	5,100
Fused Silica	38,000	2,700
Fused Magnesia	21,000	1,500

In substituting Norbide abrasives for diamond powder the following conversion of grit sizes is generally satisfactory.

Diamond	Norbide	Diamond	Norbide
No. 1	120	No. 4	400
No. 2	220	No. 5	500
No. 3	320F	No. 6	600 & 800

There are 2175 carats per pound and in one-quarter pound cans the 600 grit size, for example, costs about 9/10 of a cent per carat.

D. L. T.

The Molding Is Done in a Special Electric Furnace at High Temperatures and Pressures.

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MAY, 16-17-18, 1938

Important Notice to the Trade

Regarding Genuine Materials for Longines and Wittnauer Watches

For the protection of owners of Longines Watches and of legitimate jewelers, all genuine materials for Longines and Wittnauer Watches are now packed in individual factory sealed envelopes as shown below:

FRONT

For the Jeweler's Protection, genuine Wittnauer materials come only in factory-sealed envelopes.
DO NOT ACCEPT IF SEAL IS BROKEN

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We request jewelers and watchmakers to purchase only genuine materials packed as shown in the illustration above for the repair of our movements.

If you will insist upon having your supply dealer furnish you **only genuine** Longines or Wittnauer parts in **sealed envelopes,** you will be assured of receiving perfect precision fitting parts.

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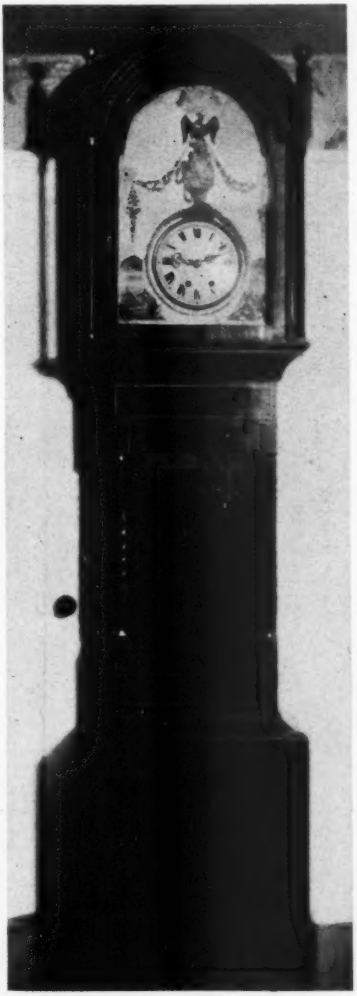
IMPORTANT—If your dealer cannot supply you with genuine Longines and Wittnauer materials, wrapped in original factory sealed envelopes, write to us for the name of a material house near you that WILL supply you with genuine parts.

Another Organ Clock

By LELAND SHAFER

In your February, 1937, issue of THE AMERICAN HOROLOGIST there was published an article by T. J. Fagan on an

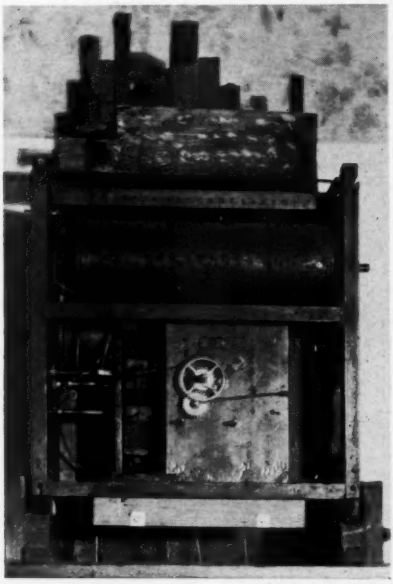


organ clock,' asking if other such clocks were common in America.

I noted in your June, 1937 issue another such clock by Mr. T. G. Wilson.

I have a tall clock which has an organ in it, which was made in Germany before 1800. The accompanying photos show the clock and a portion of the movement. The case is eight feet tall, twenty-five inches wide at the base and fourteen inches thick. The waist, or middle, is seventeen and three-fourths inches with two carved pillars, nineteen inches long.

The base and waist have middle paneles of cracked mahogany with nice wooden border with white holly inlay. The rest of the case is solid mahogany. The hood is thirty-two inches high, twenty-four inches wide and fourteen inches deep with two turned posts on corners with carvings on the curve of hood, which also has white holly inlay with glass doors on the sides.



The clock has very fine original brass hands and a nicely hand decorated dial. The dial has a German eagle at the top and scenes in the lower corners of shipwrecks.

There is a small door on the case which holds the organ with the names,

in German script, of the eight tunes which it plays.

The works are brass with wooden shafts run by two weights of sixteen pounds each. The weight which runs the organ is thirty-six pounds.

The clock strikes the hour, and is an eight-day works. It is in good working condition, but I have not as yet completely repaired the organ section.

This clock came out of a German family in Troy, New York. It was left in the basement for a long time. Should like to know if anyone may be interested in this clock. If so, would sell.

Recently, at the antique dealers' show in New York I learned that two other collectors had similar clocks, neither of which were for sale, but one of them placed value on his clock at $500.00.

City Clock Retires After Thirty Years of Service

From Fort Worth Press we note the retirement of a faithful clock, built by the Hamilton Watch Company at a cost of $2,000. The article reads as follows:

"The clock in the City Hall tower folded its hands today and waited for the zero hour.

"Its future looks dark indeed—about as black as any of the 10,000 and some-odd midnights it has timed these last 30 years.

"Wreckers, who will take away the old timepiece along with other salvage materials in the building are moving closer minute-by-minute.

"Six more rounds of the dial—or less —and the hands will stop.

"Its four faces, washed by the rains of years, will come down and be sold off for what the wrecking company can get for them.

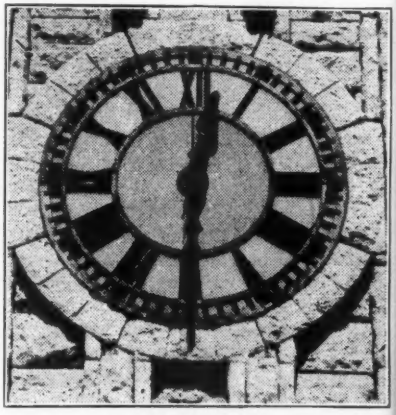
"Ed P. Ferguson, wrecking foreman, hopes that some city or town is in the market for an oversize timepiece but he hasn't had an offer yet.

"After all, there ought to be somebody who wants to know the time of day from a distance of ten blocks in four directions.

"L. G. Larson, city building commissioner, isn't much of a sentimentalist about the old clock.

" 'It's in a pretty bad state of repair,' he reflects. 'I've kept it together for the last nine years with bailing wire and ten-penny nails.'

"Mr. Larson says the main trouble is keeping the hands on the various faces all together. Somewhat worn in the gears, the 'north' face would race five minutes ahead—or maybe it was 'east' that lagged.



"Although records are lacking, old-timers say the clock was not put into place when the building was constructed in 1892-3. It came later, after the turn of the century, when a young Fort Worth city government, with growing pains, added a third floor to the building."

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KANSAS CITY, MO.

The Superior Watch Cleaner

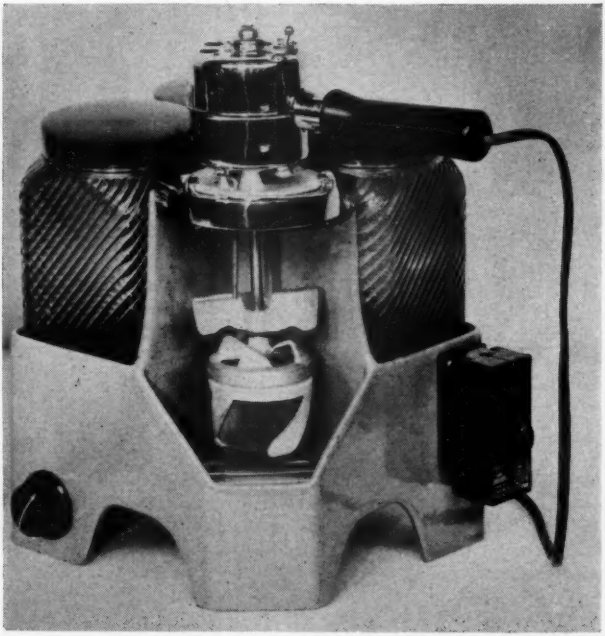
IS THE CHOICE OF THOSE WHO CAN AFFORD TO PAY MORE!

In 1934, Busch Jewelry Co. of New York installed our Watch Cleaners in each of their ten stores in the New York area.

In 1937, for their two newly opened stores in Chicago, they again installed the Superior Watch Cleaning Machines.

This highly successful and progressive organization COULD AFFORD and WOULD PAY MORE if necessary. Their choice was the Superior Watch Cleaner. BECAUSE:

It produces results and offers features not available in machines selling at double our low price. It is the most compact machine, taking space of only 8x8 inches. Has sturdy universal motor for use on AC or DC current. Has heavy duty rheostat for variable speed control. Uses square jars that reduces solution riding with basket. Has disc type enclosed heating element for thorough drying and for enabling the use of flammable solution with reasonable care. Basket is large enough in size to clean substantial amount of rings and jewelry and up to 16 size watch case, eliminating the need of extra jewelry basket. Screen of basket made from non-rusting monel screen. By the elimination of uprights common to other machines, it is unnecessary to tighten or loosen anything when changing from one solution to another. With our machine you just lift from one jar and place into the next. Jars are completely covered when machine is in operation, eliminating evaporation of solution and fire hazards.



Standard Model

$29.75

De Luxe Model

$35.00

DeLuxe Model is finished in porcelain enamel and has **automatic switch that automatically shuts off heater current after one minute,** eliminating the danger of damage, should you forget and fail to shut off heater current.

UNCONDITIONALLY GUARANTEED FOR TWO YEARS
SOLD BY LEADING MATERIAL JOBBERS

SUPERIOR WATCH CLEANER

1045 Mirror St.
Pittsburgh, Pa.

Making a Clock Fountain-Oiler

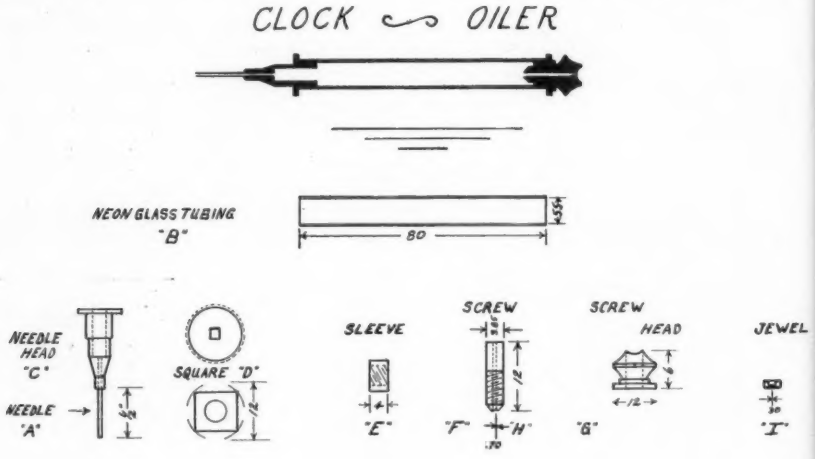
By HARRY E. NASH

CARE should be exercised when using any type of fountain oiler not to flood the pivot holes, which can so easily be done. The amount of oil desired to flow from the oiler is naturally dependent upon the size of opening in the feeder and the length of time same is held against a given object. When used with care and judgment a fountain oiler can be a great time-saver and an assurance against oil polluted and defiled with dirt, filings and dust particles.

Turn down an old discarded ratchet wheel to a diameter of 12 mm. and file flat on four sides. Drill hole in same to fit between needle-head (C) and tube (B) when (C) is inserted into (B). Same is to prevent oiler from rolling, square (D).

Turn down a piece of brass stock to fit snugly into opposite end of tube for a distance of 4 mm. Drill a hole in same with number 32 Morse drill and tap with a 7x36 tap. Sleeve (E).

Thread another piece of brass, 3.85



METRIC

HARRY E NASH

In making a clock oiler we first procure, from any drug store, a hypodermic needle ½-inch in length, gauge 32, and a piece of neon glass tubing 80 mm. in length and 5½ mm. inside diameter. The latter may be secured from your local neon sign maker. Neon glass tubing is suggested for its strength and proper thickness. File both ends of tubing perfectly flat.

Chuck needle-head (C) in lathe and turn same down to where it fits fairly tight in the inside diameter of the glass tube, for a length of 5 mm.

mm. diameter, length over all 12 mm., with a 7x36 die to a length of 6 mm. on one end. The opposite end is to be fitted friction-tight into screw-head (G) for a length of 6 mm. screw (F).

Drill a hole in another piece of brass stock, 12 mm. in diameter and 6 mm. thick, to receive friction-tight screw (F). File outside diameter flat on four sides as in (D) to aid in preventing the oiler from rolling and to keep the feeder off the bench. The design of this screw-head (G) is left to one'e own fancy.

Drill a hole .70 mm. in diameter

through (G) and (F) for an air vent (H), after (F) has been frictioned into (G).

Burnish a small-hole train jewel (I) in end of (G) to further prevent dust from getting into oil.

Secure needle-head (C) and square or disc (D) into one end of tubing and sleeve (E) into opposite end of tubing by the use of flake shellac. Be sure that sleeve (E) is set flush with the end of the glass tube (B). Heat each part gently, permitting a free and equal distribution of shellac over each surface to be sealed together. Hold parts firmly together until the shellac has set.

It is advisable, as it is important at all times, when any type of fountain oiler is used to remove all excess oil in the tube before refilling with new oil. Cleanse or sterilize same thoroughly to rid the tube of all the old oil which would contaminate the new oil. It means a beter job *completed* and a satisfied customer.

National Employment Record

We are pleased to report that during the fiscal year employment was secured for 356 watchmakers. This was a definite increase over the number of positions secured last year.

As you will no doubt recall, it is the policy of this office to favor members first. However, we are happy to be of aid to all those practicing horology in a fair and ethical manner.

Until the latter part of October we found it difficult to secure sufficient men to fill positions. However, since that time a definite change has taken place in virtually every section of the country. The number of unemployed has increased due to the fact many prominent watchmakers of long experience have been let out now making those watchmakers listed in our Employment Department Number 78.

We earnestly endeavor to seek the cooperation of all organizations, wholesale distributors and jewelry stores in notifying this department of any openings available; also the names and addresses of any watchmakers seeking employment.

M. M. HOUTWED, *Manager,*
Employment Department,
National Headquarters, U.H.A.A.

Are Your Dues Due?

We all have a reluctant feeling regarding the thought of paying out money, and during the month of December especially so. But we feel that you also realize the tremendous amount of work being carried on by your National and in order to carry on this work Dues are a necessary evil, as they are used to further our cause and educate those who have not as yet joined forces with you who realize the necessity for cooperative effort and advancement.

Why not mail that check now and assist in lowering our expenses caused by delinquent payments, necessitating a personal statement from your secretary?

USE FULCRUM OIL This Year

The most competent horological technicians say that Fulcrum Oils are the only **perfect** lubricants for Watches and Clocks. If you are not using Fulcrum Oils try them and prove this statement.

Any Material Jobber Will Supply You

FULCRUM OIL CO. FRANKLIN, PA.

Wisconsin Establishes Minimum Repair Prices

Joint Committee
The Wisconsin Watchmakers' Association and
The Wisconsin Retail Jewelers' Association

December 10, 1937

To Wisconsin Jewelers and Registered Watchmakers:

In response to a state-wide demand, the Wisconsin Watchmakers' Association and the Wisconsin Retail Jewelers' Association jointly present the enclosed Suggested Mininmum Price List for watch repairing.

With Conditions among watchmakers improving so rapidly, the following factors make necessary the establishing of prices for watch repairing at a higher level:

Shortage of Watchmakers. As a result of the licensing law, the number of watchmakers within the state has been very materially reduced. It is becoming more and more difficult to find watchmakers to fill positions and every person entering the trade must pass the strict State Board Examination.

Rising Wages. The Wisconsin Industrial Commission, in a survey of the trade in this area, has determined that the average prevailing wage for watchmakers has recently increased more than 10%. Further rise is certain.

Prohibition of Price Advertising under Section 125.08 (4) Wisconsin Statutes. Violators will be punished by criminal prosecution and revocation of license to practice watchmaking.

Now is the time to establish adequate prices so all may benefit from our Protective Legislation.

It is essential to your welfare that you obtain these *or higher* prices.

Fraternally yours,

THE WISCONSIN WATCHMAKERS' ASSOCIATION,

THE WISCONSIN RETAIL JEWELERS' ASSOCIATION.

Minimum Watch Repair Prices

(Formulated and suggested by Joint Committee of Wisconsin Watchmakers' Association and Wisconsin Retail Jewelers' Association).

POCKET WATCHES	7-Jewel	15-Jewel	17-Jewel	19-J'l & R.R. Grades
Overhauling, price & up	$2.50	$2.75	$3.25	$3.50
Mainspring	2.00	2.00	2.50	2.50
Balance Staff	2.75	3.00	3.25	3.50
Stem	1.50	1.50	2.00	2.00

WRIST WATCHES	7-J'l	10½ L. & Lg. 15-17 J'l	8¾ L. Bag. & Sm.	
Overhauling, price & up	$2.75	$3.00	$3.25	$3.75
Mainspring	2.00	2.25	2.50	2.75
Balance Staff	2.75	3.00	3.25	3.75
Stem	1.25	1.25	1.50	1.75

OTHER SERVICES	
Barrels	$2.50 to 5.00
Clicks	1.50 to 2.50
Crowns	.50 to 1.00
Click Springs	.75 to 2.00
Plate & Case Screws	.30 to .50
Dials	1.50 to 5.00
Dials—refinish	1.50 to 3.00
Hairsprings—flat	2.75
Hairsprings—breguet	3.50
Hairsprings—R. R.	4.00
Hairsprings—readjust	1.00
Jewels—balance	2.00 to 3.00
Jewels—plate	2.50 to 3.00
Jewels—center	3.00 to 5.00
Jewels—roller	1.75 to 3.00
Jewels—pallet, each	2.00 to 3.00
Jewels—cap	1.50 to 2.50
Pallet arbor	2.00 to 3.00
Pinion—cannon	2.00 to 3.00
Pinion—center	2.50 to 4.00
Pinion—winding or clutch	1.50 to 2.50
Poising balance	1.50 to 2.50
Regulators	1.50 to 3.00
Roller table	2.50 to 4.00
Sleeves	1.00 to 1.75
Timing screws—each	.75
Wheels—train	2.50 to 4.00
Wheels—hour or minute	1.50 to 2.00
Wheels—Winding or set	1.50 to 2.50
Yoke springs	1.35 to 1.50

Studies and experience of Wisconsin Watchmakers' Association and Wisconsin Retail Jewelers' Association indicate that these prices are the lowest at which Genuine Materials and Competent Workmanship Can Be Furnished.

National Trustees, U. H. A. of A.

National Trustees will meet for their annual meeting May 16, 1938 in the offices of the Executive Secretary, Hotel Statler at 9 a. m.

All State Associations are requested to forward to the National Office at once the correct names and addresses of their National Trustees.

Hairsprings

By A. ADOLPHE HUG

The principle aim of watchmaking or repairing is precise measurement of time.

About 1760 Dr. Hooke brought a great and revolutionizing improvement to horology by inventing the balance-spring commonly known as hairspring. His crude handmade creation was the first step to the most perfected delicate balance-spring of today.

A genial master of the art and profession, Arnold, created after years of research the cylindrical helical hairspring. Most English manufacturers still use it to great advantage and most satisfactorily results in marine chronometers.

Toward higher precision in small timepieces the Swiss watchmaker Brequet achieved success by giving horology a hairspring now universally used in most watches and named after its inventor, Brequet.

The body of this spring is flat but the outside terminal bent parallel over the plan of the rest of the coils.

Even today the hairspring is the field of heavy and often conflicting theory and manifold experimentation to reach perfection. Such able watchmakers as Phillips, Grossmenn and Lossier led the way.

The latest development to achieve perfect isochronism are nickle steel springs with the advantage of non-magnetism and neutralized expansion and contraction. But as those hairsprings are very soft they require such careful handling that in the opinion of many, a man on the bench a steel spring of medium temper is still preferable.

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Courses for Success for WATCHMAKERS ENGRAVERS. JEWELERS
Write for free book "Your Future and Our School"
JOHN J. BOWMAN, Director
Bowman Bldg., Lancaster, Pa.

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CHICAGO

1938 U. H. A. of A. Convention Headquarters

Boston Hotel Statler—Facilities Described

BOSTON, familiarly known as "The Hub of the Universe," has a hub of its own about which the many and varied activities of the Massachusetts metropolis revolve. Hotel Statler, New England's largest hotel, is this "hub within the hub," and Providence street, Arlington street and Columbus avenue might appropriately be called spokes radiating from the imposing 1300-room edifice in historic Park Square.

The Back Bay site upon which the hotel is located was in Revolutionary days a beach from which, according to historians, British troops embarked "on their melancholy raid in Lexington." Hence here, or in close proximity, began the War for American Independence, and within a short radius are many famous and hallowed shrines revered in the nation's history.

Situated as it is in the heart of the business, shopping and amusement districts of Boston, Hotel Statler also is conveniently located near railroad, steamship and bus terminals, and has direct transportation to and from the airport.

Hotel Statler and Statler Office Building, an integral part of the exterior facade although a separate unit in itself, dominate Park Square. "Four laps to the mile" stretch the surrounding sidewalks, from which there are six entrances to the hotel. The main entrance is on Providence street.

Parlor A, Assembly Hall

The spacious lobby, of predominant Spanish design, is decorative and appealing. Gay flower boxes, Spanish Terrazzo floor, columns of Travertine stone and harmonious furnishings give the lobby an atmosephere of friendly splendor.

At the far end of the lobby is the Palm Room with its Wurlitzer organ, providing a beautiful approach to the air-conditioned Terrace Dining Room. The lounge bar, likewise air-conditioned, is attractive and relaxful, and may be

approached directly from the Arlington street entrance. From the lobby an arcade leads to the English lunch room and air-conditioned Cafe Rouge, with sweet shop and sandwich shop adjacent.

Food service is not a problem in Hotel Statler. The four restaurants, each offering a different type of menu and service, enable the guest to select whichever type best meets his or her individual preference.

Overlooking the lobby is the restful Mazzanine Lounge, reached by stairways and elevator. Here are located the library, several function parlors, beauty salon and the Georgian Room, beautifully panelled in oak, in itself a small ballroom.

The Imperial ballroom suite, approached by a separate entrance on Columbus avenue, as well as from a lobby arcade, has a seating capacity of 2,000 persons. Carrying out the Italian Empire scheme of its assembly room, the ballroom has a grandeur rarely found in any hotel. Accoustically perfect, it features a public address system, constantly operator-controlled, and a completely equipped stage. Sound and silent picture projectors are also standard equipment. During the summer months, it is comfort-cooled.

Each of the Hotel Statler's 1,300 modern guest rooms is equipped with bath, circulating ice water, radio reception, full-length mirror, servidor, sterilized cellophane-wrapped drinking glasses and many distinctive features for comfort and convenience, such as certified lighting for eye comfort. A morning newspaper under the door is typical of Statler guest service.

Floor clerks on each of the eleven guest room floors are constantly at the guests' service. A hospital, with operating room, is maintained in the hotel. The variety of shops located in the hotel and office building afford guests shopping opportunities equal to those found in many fair-sized cities and towns.

It is no wonder that Hotel Statler in Boston is recognized as one of the country's leading convention hotels and that U. H. A. of A. has selected it for their convention headquarters.

National Publicity

Members of U. H. A. A. should avail themselves of a goodly supply of our Association stamps and use them on every opportunity to promote a wider recognition of the Association and your connection with same.

Regardless of whether you have a Plaque or not you should use these stamps and all other advertising material which will attract public attention and recognition of those things the National stands for.

Patronize Our Advertisers
Mention "The American Horologist"

WORLD'S STANDARD FOR OVER A CENTURY

GENUINE AMERICAN WATCH MATERIAL SOLD EXCLUSIVELY

JURGENSEN Superior Recoiling Mainspring BPK

450 SIZES

GENUINE SWISS WATCH MATERIAL SOLD EXCLUSIVELY

WITH FINISHED ENDS FOR ALL MODELS OF SWISS WATCHES ONLY
$2.50 DOZEN—$30.00 GROSS

Complete Stock of Jurgensen Main Springs with Unfinished Ends

Sole Agents **BUHL, PEER & KEEFE** 41-43 MAIDEN LANE NEW YORK CITY, N. Y.

1938 Convention, Boston, Mass.

Delegates and guests of the Fourth Annual National Convention will have the pleasure of being entertained by the oldest watch factory in America. Tuesday, May 17, 1938, at 10 a. m., the Waltham Watch Company will have bus transportation at the Convention Headquarters. The trip will cover a short historical trip through Cambridge, Arlington, Lexington and Concord, thence to the factory for lunch and a visit through the Waltham Watch plant. Delegates will find this trip most valuable and entertaining. From an educational standpoint they could not wish for a greater opportunity, both historical and technical.

Reservations are being made extremely early for our fourth convention and it appears there will be more accredited Delegates than in the past. Associations are arranging for their Delegates expenses well in advance. Resolutions of vital importance to our future welfare are arriving weekly. Don't fail to send your Delegates to this all important Conclave of Watchmakers from coast to coast. Arrange you vacation for Boston Mass. May 16-17-18, 1938.

Waltham Watch Company—Waltham Mass.

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THE WATCH AND CLOCK MAKER

published monthly in England. A review of all that is new and good in Horological Science with particular attention to the needs of the technician.

Editor, Arthur Tremayne; Technical Editor, T. R. Robinson. World wide subscription one dollar yearly postfree. N. A. G. Press, Ltd., 26, Old Street, London, E. C. 1, England.

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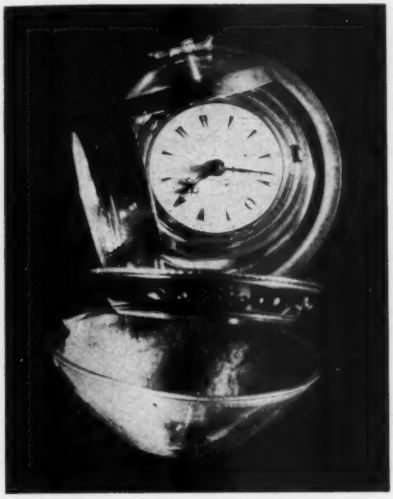
Jewelers and Watchmakers Supplies

CLARK BUILDING

PITTSBURGH, PA.

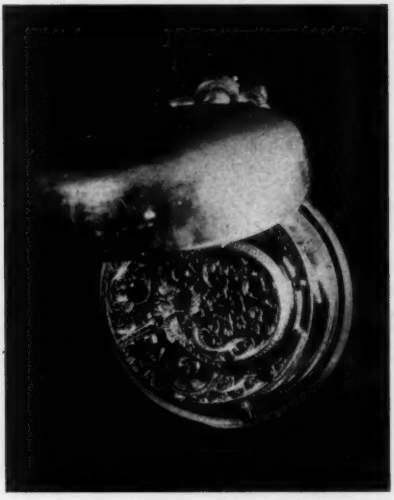
Beauty and Art from the Past

Through the courtesy and cooperation of our honorary member, **HENRY FORD**, Dearborn, Michigan, we herewith display reproductions of some of the outstanding timepieces from the Ford collection, which is the property of the Edison Institute.



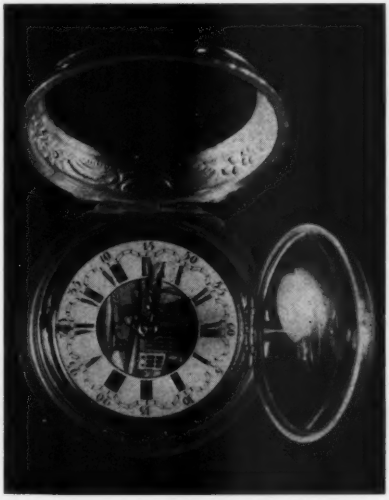
S-136

Watch with four separate silver cases, the third case having an outer covering of tortoise shell. White enamel dial with Turkish numerals. Steel hands.



S-137

Shows inner case with movement. Balance cock, regulator guide and pillars pierced and engraved. Verge escapement; chain and fusee drive. Made by Edward Prior, London, 1800-1830. Prior, a maker of repute, was particularly known for his watches made for the Turkish trade.



S-138

Is a double cased silver watch; outer case repousse. Center half of dial is scene in colored enamel. Hands are of brass, pierced and engraved.

S-139 shows inner case hinged to movement. Balance cock, regulator guide and pillars pierced and engraved. Verge escapement; chain and fusee drive. Made by James Segrut about 1764.

WATCH-CRAFT

REG. U.S. PATENT OFFICE . No. 348436

EXCLUSIVE FEATURES

- **Jewels for ALL SIZES smallest Baguette to 18s Pocket.**
  No other outfit has this range of sizes.
- **Jewels and Reamers Especially manufactured for AMERICAN as well as SWISS Watch Plates and Settings.**
  No other outfit has jewels and equipment to handle ALL work satisfactorily.
- **STUMPS for REAMING.**
  They fit up into the small wheel recesses in watch plates and insure accurate reaming. ABSOLUTELY ESSENTIAL FOR REAMING PALLET BRIDGES AND SMALL WATCH PLATES.
- **Hand Selected 1st Quality Red Ruby Genuine WATCH-CRAFT jewels.**
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  All you need is a pair of tweezers to set a jewel.
- **CHROME PLATED JEWELING TOOL.**
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- **STEEL JEWEL CABINET.**
  2 drawer Add-a-Unit Steel Cabinet, beautifully grained mahogany finish. Stacks with all other Add-a-Unit cabinets.
- **PRECISION MATCHED JEWELS AND REAMERS.**
- **MADE IN AMERICA in our own factory.**

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LEVER PRESSURE prevents BROKEN JEWELS and DAMAGED PLATES. With our Tools you "feel" when a Jewel is entering the hole properly or, when the Jewel Pusher is making contact with the Plate. SCREW Pressure is too drastic and will break Jewels, or even dent Plates before you realize or can see it.

WATCH-CRAFT OUTFIT

WITH GENUINE WATCH-CRAFT JEWELS

5 Different Kinds—CURVED BALANCE—FLAT BALANCE—BALANCE CAP—PLATE—CENTER. From SMALLEST BAGUETTE to and including 18 Pocket Size. (Which you get in no other outfit but Little Giant.) Hand Selected from the Finest First Quality Ruby Jewels—Diameters Accurate to within 1/200th of a millimeter—Perfectly Centered, Accurately Gauged Polished Holes.

CHROME PLATED JEWELING TOOL
2 DRAWER ADD-A-UNIT STEEL CABINET

No. 2232 — Complete outfit as illustrated and described above. Watch-Craft Friction Jeweling Tool in Mahogany Finished Wood Case, and one each of every size and kind of Watch-Craft First Quality Ruby Friction Jewels, each in a numbered bottle in two-drawer Mahogany Finished Add-a-Unit Steel Cabinet. 20 extra Empty Bottles. Cabinet has lock-stop drawers that cannot fall out. Cabinet is made to stack with all other Marco Add-a-Unit Cabinets..... $57.50

$5.75 A Month For 10 Months

No. 2235—Same as above but without the 75 Center Jewels..... $46.50

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No. 2233 — Same as above but without the 75 Center Jewels and the 61 Plate Jewels..... $38.75

$3.88 A Month For 10 Months

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You can no longer affo... a W... Little Giant Friction Jew... rictio... now being used in new... by a... manufacturers, both A... iss... greatest value, howeve... an, ... them to replace old-t... jew... Watch-Craft or Little G... eling... Friction Jewels can be s... tim... setting burnished-in jew... is ... secure, but more accur... tisfac... way.

C. & E. MA...

A GREATER VAL... A...

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Friction Jeweling Systems USED and TAUGHT at

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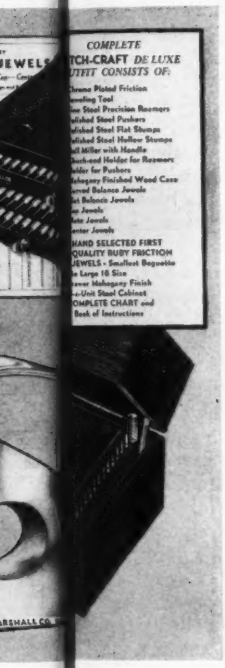

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Unequalled by any other System except Watch-Craft

Frankly we recommend our Watch-Craft Outfit. It's the best dollar for dollar value. However, for the Watchmaker who wants a cheaper tool, we guarantee our Little Giant, made in America, in our own factory, to be far superior to any other Friction Jeweling tool on the market today.

527 JEWELS

248 Flat Balance Hole Jewels (4 each of 62 sizes).
96 Balance Cap Jewels (12 each of 8 sizes).
183 Plate Jewels (3 each of 61 sizes).

Jewels for all sizes, smallest baguette to pocket including 18s and railroad. Each size and kind in a numbered bottle. This complete range of sizes is supplied in no other systems but Little Giant and Watch-Craft.

- 156 BOTTLE WOOD CABINET.
- BLACK RIPPLE FINISH TOOL IN WOOD CASE.
- Precision Matched Jewels and Reamers.

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No. 2236—Little Giant Friction Jeweling System complete as described above **$39.50**

$3.95
A Month
For 10 Months

CIPAL CITIES

Studies in the Lever Escapement

By HAROLD C. KELLY
Member National Technical Board U. H. A. A.
(An address given before the Horological Guild of Spokane)

Harold C. Kelly

In this study of the lever escapement we are particularly concerned with practical bench work, that is, the placing in good order the escapement of a given watch. It is important, however, that we have some understanding of the theoretical principles envolved and we shall indulge, therefore, in as much theory and escapement design as is necessary to obtain a clear picture of the essentials of escapement construction.

The importance of understanding the escapement cannot be over-estimated. Large pocket watches often function quite satisfactorily with faulty escapements but with small wrist watches it is very different. The escapements in small ladies' watches, for example, must be practically perfect. Since the larger percent of the watches that are brought in for repair today are wrist watches, there is a need for greater skill in escapement work. Inadequate knowledge only results in an endless amount of trouble with watches that stop persistently, though perhaps only occasionally. Erratic rates, too, can be traced to defective escapements.

The best way to obtain a practical understanding of the escapement is to proceed step by step, studying the separate functions, after which the escapement action as a whole will be analyzed. Our attention will first be directed to the problem of banking escapement to the drop.

Banking to the Drop — The term "banked to the drop" means that the banking pins are turned in such a position that a tooth of the escape wheel will slide past the let-off corner of the pallets and the lever will reach the opposite bank.

In order to affect a banked to the drop condition it is first necessary to turn in both banking pins. The impulse face of one pallet will now show contact with the impulse face of a tooth of the escape wheel, but owing to the fact that the banking pins have been turned in, the tooth is unable to pass the let-off corner of the pallet. Let us assume that the impulse faces of the receiving pallet and a tooth show contact. Turn the banking pin, against which the lever now rests, away from the line of centers slowly until a tooth passes the let-off corner of the receiving pallet. At this instant another tooth will lock on the locking face of the discharging pallet. Next, move the lever to the opposite banking pin resulting in a contact being shown between the impulse faces of the discharging pallet and a tooth. Turn the banking pin, against which the lever rests, away from the line of centers until the tooth drops as already explained, and the job of banking to the drop is completed.

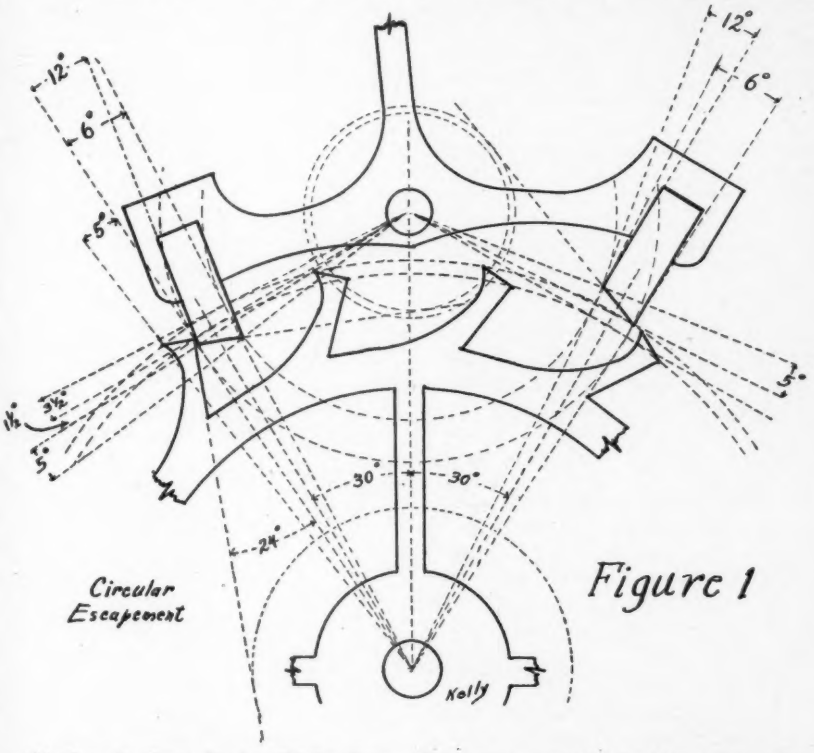
Drop Lock—The extent of the lock on the pallets after an escapement has been banked to the drop is called drop lock. This lock takes place the instant a tooth drops on the locking face of a pallet. Thus drop lock is not a product of the banking pins, but rather, the position of the pins when banked to the drop, mark out the location of drop lock on the pallets.

Now in Swiss watches and some American wrist watches it is not practical to bank the escapement to the drop because of the fact that the banking pins are not supplied with eccentric screws.

In this case the usual practice is to slowly move the lever until the escape wheel drops and at the same instant cease moving the lever and take note of the extent of the lock on the pallets. A slight additional motion of the lever should be required before the lever would reach its bank which is, of course,

beyond that of drop lock. The additional motion is called slide and will be treated on more fully a little later.

Correct Drop Lock—Drop lock is a varying quantity, depending on the position of the pallet stones in the pallet arm, but it should be as light as possible consistent with proper safety in action. A drop lock of 1½ or 2 is the amount usually adopted in modern escapements.



Circular Escapement

Figure 1

Altering the Drop Locks—If the drop locks are too light or unsafe, a deeper lock can be had by moving out one or both of the pallets. It must be remembered that when one pallet is moved the lock is changed on both pallets. The reason for this is because of the fact that it will be necessary to turn one banking pin to permit the lever to move farther before the tooth escapes, and consequently the other pallet stone moves deeper into the escape wheel before it receives the tooth.

Out of Angle—The lever should move an equal distance on either side of the line of centers. If the lever does not move an equal distance on either side of the center line, the lever is said to be "out of angle." If the drop locks are deep, out of angle can be corrected by moving *in* the pallet on the side where the lever's angular motion is shorter from the line of centers. If the drop locks are light, out of angle can be corrected by moving *out* the pallet on the side where the lever's angular motion is longer from the line of centers. If the drop locks are satisfactory, out of angle (if slight) can be corrected by carefully bending the lever as close as possible to the pallet staff. This can be done by holding the lever with a small pair

of pliers and bending it with the thumb and first finger. It is desirable to rebank the escapement to the drop after each alteration.

In order to ascertain the extent of out of angle with any degree of exactness, it is necessary to place the balance in the watch and use the corner safety test about which more will be said later.

The Draw—Let us leave the subject of lock for a few minutes and consider the draw, drop, shake and the lift.

The force that keeps a pallet against its bank is called draw. It exists because of the inclination or slant of the pallet's locking face and the shape of the tooth. It will be observed in Figures 1 and 2 that the receiving pallet inclines in the direction toward the pallet center and the discharging pallet inclines in the same direction but away from the pallet center thus forming the angle for draw. A draw of 12 degrees as shown is considered sufficient by most horologists.

Examining the Draw—Take a pivot broach or similar small tool and lift the lever away from its bank, but not far enough to cause the escapement to unlock. Now release the lever and in so doing, the lever will, if the escapement is correct, return immediately to its bank. Try this again with the lever against the opposite banking pin. The lever should at once return to its bank.

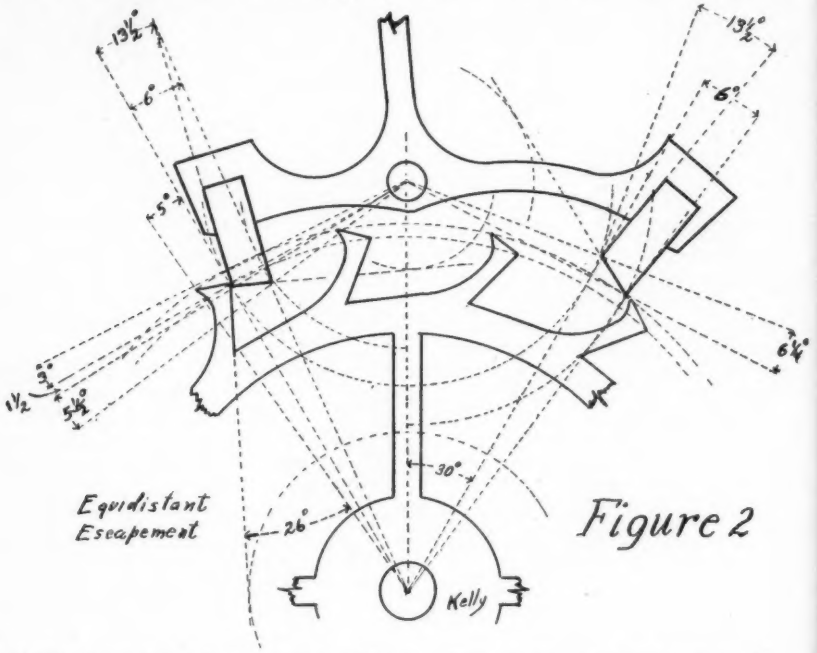


Figure 2

The purpose of draw is to avoid unnecessary friction between the guard pin and the roller table. When the watch receives a jolt the lever is thrown away from its bank and guard pin comes in contact with the roller table, but the action of draw causes the lever to return

Best Watch Repairing For the Trade

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at once to its bank. Draw should be sufficient to affect the return of the lever to its bank for all ordinary conditions. If the draw is excessive, there will be an unnecessary recoil of the escape wheel causing a condition whereby too much of the force of the balance and spring would be used in unlocking the escapement. The result would be a waste of power and a shorter arc of motion of the balance.

There is a factor relative to the draw that should not be overlooked. It is this: When a tooth is locked on the receiving pallet, draw is the *weakest* when the pallet is in the position of its deepest lock and it becomes *stronger* as the pallet recedes from the tooth. When a tooth is locked on the discharging pallet, draw is *strongest* when the pallet is in position of its deepest lock and it becomes *weaker* as the pallet recedes from the tooth. Moreover it can be seen that draw would even cease to exist on the receiving pallet if the lock is very deep whereas there would still be draw on the discharging pallet. For this reason some horologists advocate a draw of 14 or 15 degrees on the receiving pallet and 12 degrees on the discharging pallet.

Drop—Drop is defined as the free motion of the escape wheel at the time when one tooth passes the let-off corner of a pallet and another tooth comes in contact with the locking face of the opposite pallet. Drop may be also defined as the distance a tooth of the escape wheel travels without doing any work.

Examining the Drop—With a tooth locked on the receiving pallet observe the space that separates the let-off corner of the discharging pallet from the heel of the tooth. Now move the lever to the opposite banking pin thereby causing a tooth to lock on the discharging pallet. Next observe the space that separates the let-off corner of the receiving pallet from the heel of the tooth.

Of course the drop should be equal but we do not always find it so. A small drop on the receiving pallet is called "close outside" and a small drop on the discharging pallet is called "close inside." These errors call for correction. If close inside, tip one or both pallets away from the pallet staff. If close outside, tip one or both pallets toward the pallet staff.

Usually moving one pallet is all that is necessary. The question may arise as to which pallet to move. This would depend largely on the condition of the draw, the drop locks, and the angular motion of the lever from the line of centers, for we shall soon learn that whenever a pallet is shifted for any reason all of the above conditions are altered.

Shake—Shake is defined as that space separating the let-off corner of a pallet and the let-off corner of a tooth when the opposite pallet is locked at the lowest locking. Shake is similar to drop except that the examination for shake occurs at the time when the tooth is locked at the lowest locking corner of the pallet. When moving the lever away from its bank but not enough to unlock the escapement, it will be observed that a slight recoil of the escape wheel has taken place. This action lessens the space between the let-off corner of the pallet and the heel of the tooth showing that shake is always less than drop. If an escapement has no shake the watch will stop.

The Lift—Modern escapements have a total lift of 8½ degrees. The amount of lift separately on tooth and pallet is designed in varying proportions in different makes of watches.

The lift in a club-tooth escapement is very complicated and requires considerable study to understand its action. It will be noticed that the lift increases continually on the receiving pallet while on the discharging pallet the lift gradually diminishes. This condition exists because of the circular motion of the pallets. On the receiving pallet the

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wheel moves up as also does the pallet and the pallet's locking corner moves with greater velocity than the let-off corner. On the discharging pallet the condition is reversed and the wheel moves down while the pallet moves up. Also the let-off corner of the discharging pallet moves with greater velocity than the locking edge.

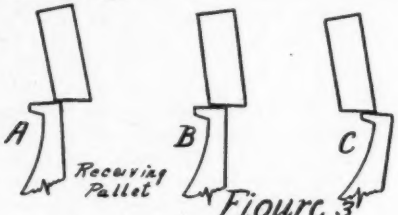

Figure 3

A good action between wheel and pallets is shown in Figures 3 and 4. Note that as the tooth leaves the locking faces of the pallets, the toe of the tooth only shows contact with the pallet's impulse faces (see A, Figures 3 and 4). Contact in this manner continues about two-thirds across the pallets (B, Figures 3 and 4), when finally the two impulse faces meet parallel, and after that the heel of the tooth passes the let-off corner of the pallets (C, Figures 3 and 4).

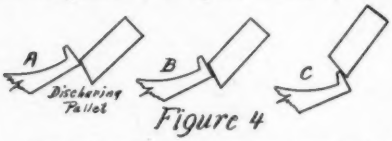

Figure 4

The heel of the tooth comes into action quicker on the discharging pallet, also there is a tendency of the tooth to move faster along that portion of the lifting plane near the let-off corner. The opposite takes place on the receiving pallet, that is, the action is faster at the start of the lift.

To obviate this difficulty, A. Lange and Sons some years ago made watches with escapements so designed that the receiving pallet had a convex lifting face, the discharging pallet a concave face and the lifts on the teeth were also curved (Figure 5). This system, it will be observed, would make the lifts practically equal and the velocity of the tooth more nearly constant.

Loss in the Lift—There is a certain amount of loss in the lift particularly in the equidistant escapement and the wider the pallets the greater is the loss. To show the error more plainly the English ratchet tooth with wide pallets is illustrated (Figure 6). The tangents

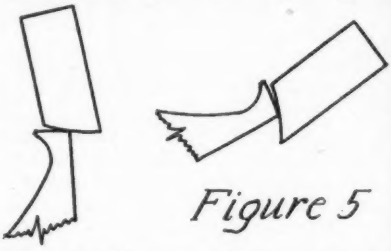
Figure 5

AC and AD are straight lines, but the escape wheel describes the circle EF, hence these lines must deviate from each other. This deviation represents the loss in lift. In order that 8½ degrees of

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lifting take place, the lifting planes would require an angle of about 10½ degrees or 2 degrees additional. It will be noted that the angle representing the loss is a little wider on the receiving pallet because of the shorter arm.

discharging pallet is given as 6¼ degrees.

In the circular pallets with club tooth wheel the loss of lift is very little for the reason that the tangents are planted mid-way between the locking and let-off

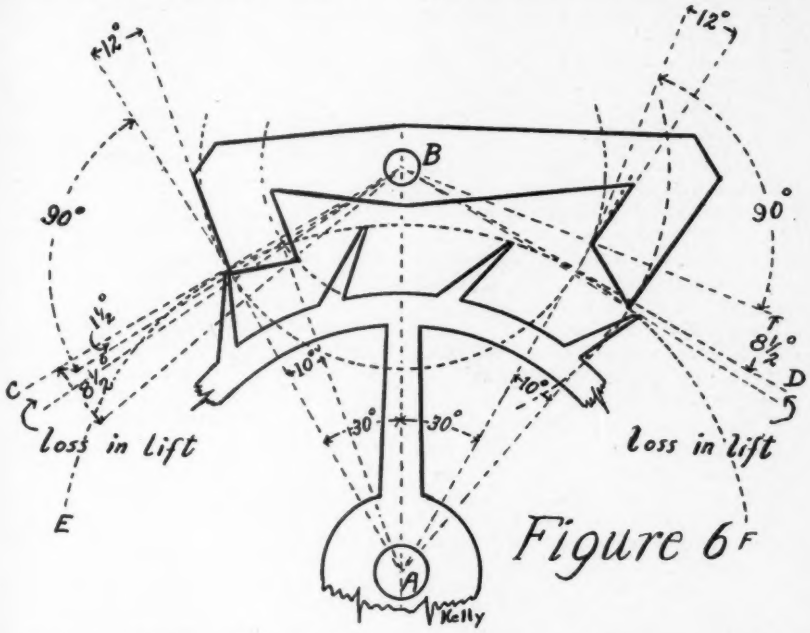

Figure 6

In the equidistant pallets with club-tooth wheel the loss of lift is principally on the discharging pallet, as shown in Figure 2. Note that the receiving pallet shows a lift of 5½ degrees, whereas the corners of the pallets, as a study of Figure 1 will show. This discussion of the lift should impress all of you of the importance of the proper angle of lift on the pallets and every escapement should be carefully examined with regard to this factor.

(To Be Continued)

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Open Letter to Readers of The American Horologist

Brother Watchmakers:

Many inquiries have come to me from watchmakers throughout the United States who are interested in learning how watchmakers' licensing laws can be obtained in their own states. For the benefit of all who seek such protective legislation, I am prompted to make the following suggestions.

A strong State-wide Association is the first essential for success in obtaining legislation. MAN-POWER IS NECESSARY. A weak association cannot expect to succeed. Build your membership and when you are strong you can obtain whatever you desire in legislation.

I suggest the first step be to send a *short* letter something like the following to every watchmaker in your state.

Fellow Watchmaker:

This Association proposes the enactment of protective licensing laws for the Watchmakers of this State similar to the Wisconsin Watchmakers Licensing Law. Prices, wages and general trade standards have already resulted in Wisconsin. We seek the same benefits for the watchmakers of this state.

Your membership in this Association is needed to make this possible.

Cost of membership is slight, only ..... Dollars a year including membership in this Association and membership in the United Horological Association of America, and our monthly magazine, THE AMERICAN HOROLOGIST.

INVEST NOW IN YOUR FUTURE. Send check or Money Order to.....

Use this legislation as an objective of your association and work actively to build the necessary strength and do not attempt to obtain legislation until you have sufficient strength. Failures are costly and greatly enlarge the problem when you try the second time.

Further suggestions will be made upon request.

Fraternally yours,
B. W. HEALD,
National Legal Advisor,
U. H. A. of A.

Time

Time is not only the measure of life. It is the very stuff that life is made of. "It is one of the provoking but interesting things about life that it will never stop a moment," says David Grayson. "No sooner do we pause to enjoy it or philosophize over it than it is up and away, and the next time we glance around it is vanishing over the hill—with the wind in its garments and the sun in its hair."

It is so with a thought, and with an act—it is so with the words that I have just written. They are *here,* they *were* here, they have *gone.* We may find new words, we may perform new acts, but we can never bring back the old ones. The past is always past, the future always future, and the present becomes the past even while we attempt to fix it.

Each moment as it passes is the meeting place of two eternities. As the clock strikes the moment that begins a New Year, we are standing at a pivotal point, vividly conscious that the Trinity of Time—Past, Present, and Future—faces us with a question. It is only natural, then, that we should draw out our personal balance sheet, consider our old accounts—and ask for extended credit.

Time was is past; thou canst not it recall: time is thou hast; employ thy portion small; time future is not; and may never be: time present is the only time for thee.

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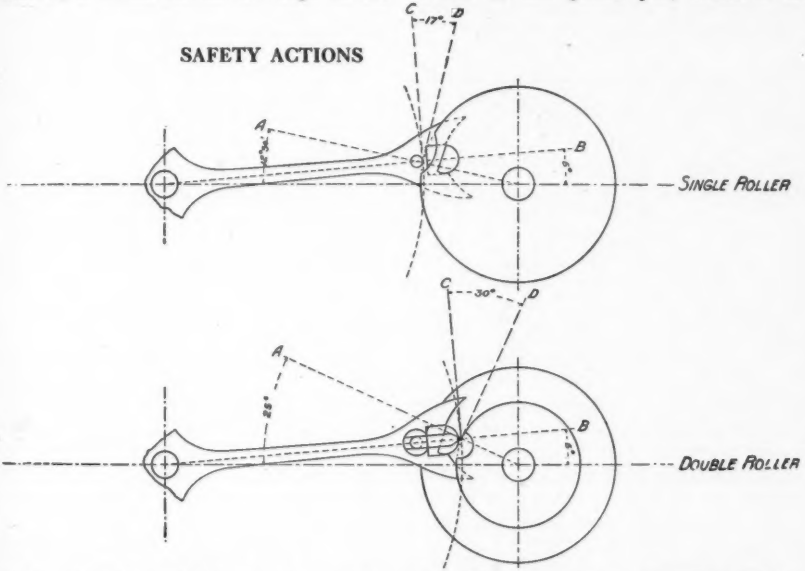
The Safety Action

By OLOF OHLSON
Member U. H. A. A. Technical Board
(Courtesy Waltham Watch Co.)

The function of the safety action is to guard the escapement against unlocking from sudden shocks, or outside influences, while the jewel pin is out of engagement with the fork. In the lower grades of watch movements this guard duty is assigned to the edge of the table roller and the guard pin. The passing hollow, a small cut in the edge of the roller, directly outside the jewel pin, allows the guard pin to pass the center line during the jewel pin action. This form of safety action is called "single roller" and is shown in the figure. As will be seen from this drawing, the edge of the roller is made straight, or cylindrical, and the guard pin is bent in such a way as to present a curved portion to the edge of the roller. The advantage gained from this construction is that the guard pin can be adjusted forward or back by simply bending it at the base, without its action being in any way affected by a reasonable amount of endwise movement of either the balance staff or the pallet arbor. The double roller escapement presents a more desirable form of safety action, for two reasons: first, the intersection of the guard pin with the roller is much greater, making it perfectly safe against catching, or wedging; second, any shock, or jar, causing the guard pin to touch the roller, will have less effect on the running of the watch, because the impinging takes place on a smaller diameter. The diagram, illustrates the above statements. The wedge action of the guard pin, when it is brought to the roller, is represented by the lines *C* and *D*, which are at right angles to the lines *A* and *B*, thus forming tangents to the points of contact. It will be seen that with the single roller this wedge is 17°, whereas in the double roller it is 30°, a very considerable difference in favor of the double roller.

SAFETY ACTIONS



Make This Sign of Identification a Part of Your Equipment

Master Watchmakers Association of Oregon

On December 14th, the Master Watchmakers Association of Oregon resumed their activity. A dinner and meeting was held in The Chamber of Commerce bldg. Portland, Oregon. The officers and members present pledged themselves to enlarge upon their activity thruout the State. The decision was made to push the National plaque and insignias in our territory in place of our own.

Wisconsin Board of Examiners In Watchmaking

The next examination before the Board is set for January 13-14 at the office of the Secretary.

The Board will also meet in Madison, Wisconsin, January 20th to conduct their state duties, and in the evening the Board members will attend the meeting of the Madison District Guild.

Cincinnati Guild

The officers and members of the Cincinnati Guild extend their best wishes for a most happy and prosperous New Year to all officers of the national organization and members of affiliates in Ohio and likewise to officers and members of affiliated state associations and guilds, both near and far.

Mr. O. Fuller of the E. & J. Swigart Co., in a statement remarks that his firm had a satisfactory volume of business in 1937, possibly equal to that of 1936, and the outlook for 1938 looks very promising. A general spirit of optimism seems to pervade the jewelry business in the central states. From his statement we can safely assume that the jewelry industry will hold its own in the future as it has done in the past. The E. & J. Swigart Co. wish all the members of the U. H. A. A. a happy and prosperous New Year.

The Cincinnati Guild will sponsor their second annual grand ball at the Hotel Sinton Saturday, January 15, 1938. Mr. Frank Foegler, chairman of the committee on arrangements, reports very satisfactory progress and declares the grand ball will be bigger and better and hopes that all the members of the jewelry industry in and around Cincinnati will be present at this gala affair. A cordial invitation is extended to all.

Member Frand Garrett, located at 504 Broadway, has no fault to find with business conditions. Business, he says, is decidedly on the upturn. The Christmas business has come up to all expectations, and the sale of watches was exceptionally good.

Mr. Jos. Vogelsang, of Vogelsang and Sohngen, 208 E. 5th Street, expressed himself as being well pleased with business in 1937. The Christmas business was very satisfactory. His firm wishes all the members of the Cincinnati Guild a very happy New Year.

Member Fred J. Engelke, erstwhile of Cincinnati, but now connected with the Wilhelm Jewelry Store of Portsmouth, Ohio, will soon leave for the South to

There's a welcome for you at friendly Hotel Cleveland . . .

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recuperate from the effects of an operation. Our best wishes for a speedy and permanent recovery.

Message from the President of the Cincinnati Guild

Mr. Harry Flotemersch, the newly elected president of the Cincinnati Guild, wishes to express to the officers and members of the Cincinnati Guild and affiliated guilds in Ohio his good wishes for a very prosperous, happy and active New Year. He says it should be the privilege and duty of every member to make himself better acquainted with the aims and objectives of this, his organization, and then firmly resolve to enlist himself as a more active member in his guild. He is reminded of the famous English admiral, Lord Nelson, who preached the patriotic creed in a few simple words but powerfully strong in their application, when he said, "Every Englishman is supposed to do his duty." Not to be outdone by the great Lord Nelson, I am asking all members to do their duty and then some.

Let us make 1938 a banner year.

Pertinent Thoughts for the New Year to Ohio

With this issue the Ohio Watchmakers' Association and affiliated guilds enter upon a new year.

Like all previous years, we are wont to indulge in various good intentions; but, alas, at the end of the year we are often obliged to register a blank.

We have heard of a certain road being paved with good intentions, but qualified it should say, with good intentions not kept.

Let us, as members of the O. W. A., in 1938 also make some good intentions, then share these good intentions with other interested members, with them work out a workable program, and transfer our good intentions into sound business policies, and with these pave the road to the Beautiful City of Good Accomplishments and there receive our reward: A Crown of Success.

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Facts About the Jewelry Business

Excerpts from Report of W. J. Hindley, Executive Secretary Washington Jewelers' Association

IT is one of the oldest arts and crafts in human history. Older than the Bible and Hebrew civilization.

Up until 1929, it was an industry running into figures close to 150 millions in annual business volume.

It suffered severe reverses in the years following 1929. From 19,998 jewelry stores in 1929, it fell to 14,313 in 1933, a loss of over one-third in jewelry establishments. The business volume in those same years fell 67 per cent in 1933 and gained only 5 per cent in 1934.

These 14,313 stores are owned and operated by 14,370 individuals, showing rather conclusively that the jewelry store is generally an individual store, in fact 63 per cent are one-man stores; 16 per cent are owned by partnerships and 20 per cent by corporations.

These 14,313 jewelry stores employ 20,338 full-time workers and 4,258 part-time employees.

Being generally an individual store, these figures show that on the average, there are only three people to two stores, so that the one-man store is the rule rather than the exception. This means that the volume of merchandise sales in these stores is small, the majority of such stores confining much of their activity to repair departments and convenience merchandise. In fact, over 80 per cent of the jewelry establishments do an annual business of less than $7500.

These are some of the startling facts of the jewelry industry.

These facts show the paramount needs of closer organization of the retail outlets; of more united efforts by jeweler groups to protect their trade against those inroads upon their business and profits now being made by Department Stores, Mail Order Houses, curbstone peddlers and doorbell-ringers. Of more massed action by the Jewelry Industry to place their highly specialized merchandise before the public; to awaken jewelry consciousness in the minds or hearts of prospective customers, so that a fairer and more equitable proportion of the business volume of exchange shall find its way into the jewelry store; to have massed action of jewelers through the State Association so that in the hour of threatened tax menace, license restriction, or some destructive trade practice, your State executives can speak in no apologetic gesture of the solidarity and unity of the entire jewelry trade.

These facts also explain in a very large sense just why jewelry organizations are so hard to effect and maintain. The average store demands the undivided attention of its owner. The average net profits are so meagre that even the annual dues look forbidding. Jewelers find it difficult to attend meetings, hence they are apt to grow narrow in their views and selfishly individualistic in their practices. Being too much alone, any man will grow distrustful and suspicious of his fellows, especially his competitors, hence the lack of loyalty and local co-operation.

The trade has suffered a terrific slump in the past ten years. Some of it was not the jewelers' own fault, but until we can rebuild jeweler confidence, renew mutual good will and co-operation and get the jeweler, himself, out of his narrow rut, any increase or return of business normalcy will drift over to others, technically less qualified than you are, but who are alert to the new demands of the times, mass their energies and go out after the business.

Your Association is indispensable, its cost a mere bagatelle, if it helps to develop you along some of these lines, providing you opportunities of meeting your fellow merchants and craftsmen, acting as your intermediary when menace or hazard assaults your business, contacting the community and state and nation for you, when and where you have neither the time nor the inclination to do it yourself.

But, Associations are simply aggregations of voluntary individuals. If individuals lose their contacts and interest, then Associations must pass out of the picture. They are not an end in themselves, they are here to be of service. If they are vital to the industry, they should be more largely and generally supported. If they are decadent and perfuctory they should be given a decent burial. None should be asked to contribute a dime to an institution that ceases to function. No busy man should be asked to lead a lost cause. You should either go ahead with new plans, new activities, and larger support, or you should kindly and tenderly lay it away with the mothballs and lavender of disappointed hopes and go back to your stores with no higher motive, no kindlier feeling, no better program for this most ancient, most honorable and most worthwhile craftsmanship, than the bloody tooth and claw of cut-throat competition, "every man for himself and devil take the hindmost . . ."—and this, right down in your hearts—you know the Jewelers will never do.

Making a One-Day Hall Clock Run Longer

Recently a watchmaker was confronted with the problem of making a one-day hall clock run for a longer period of time. This clock happened to be an old wooden movement and the weight cord when run down would extend to the bottom of the case. The horologist considered using a lighter cord, which could be done successfully as the weights were rather light, but the problem was hard to solve for by using a lighter cord and suspending the weight on a small clock pulley attached to the frame there was nothing to prevent this cord from becoming entangled at times.

This explanation was made to the owner but he was not satisfied with it and set upon having his clock run for two or three days at least. The owner had some knowledge of mechanical powers and solved his problem by purchasing two inexpensive automatic fishing reels and attaching them to the lowest possible pressure thereby taking up the slack as it occurred and permitting his clock to run a little over three days.

The attachment that an owner has for an old timepiece is sometimes a source of wonder to the watchmaker but this attachment is a sentimental association of the timepiece with events of the past which endears it to its possessor. Old clocks are held in more regard probably than are old watches as they are a piece of furniture, often of beautiful design, and the owner remembers the ticking away of the golden hours of life and when the thought of parting with one of these keepsakes or heirlooms occurs there is a tugging at the heart-strings which all at some time have felt. Whenever one of these old timepieces is brought in to the horologist for repair he should be sympathetic with the owner and do his best to restore the piece to its original usefulness and beauty as most owners are willing to pay extra for the special consideration these pieces sometimes demand. Many horologists are neglecting a source of revenue that does much to build up confidence in and respect for the profession generally and the good will engendered thereby is invaluable to them individually.

D. L. T.

Daily Thoughts

If your cup is small, fill it to the brim. Make the most of your opportunities, of honest work, and wholesome pleasure.—Henry van Dyke.

In all things of the world, the men who look for the crooked will see the crooked, and the men who look for the straight will see the straight.—John Ruskin.

Send in the names of fellow watchmakers to whom you would like us to send sample copies of the *American Horologist.*

Mention "The American Horologist"

Making of Watch Case

By GEO. GRUEN
Member National Techical Board

THE cases of the watches are made of silver, gold, gold-filled and platinum. Gold is used more frequently as it is not as expensive as the latter metal. There are a number of colors to gold—yellow, green, rose, white, etc. Pure gold (24 karat) is obtained from the U. S. Mint in Philadelphia, and is of a yellow color. Pure gold is too soft and would wear quickly, other metals and materials are added to it to increase the strength and give longer wear, but still retain the beauty and value of gold. For example, 14 karat solid gold, which is the usual grade of gold found in high-grade watch cases, consists of 14 parts of pure 24 karat gold with the additional 10 parts of alloy.

The following lists the metal used to obtain the various colors:

14 karat *Yellow* gold—Gold, Silver, Copper, Zinc, Nickel.

14 karat *White* gold—Gold, Nickel, Copper, Zinc.

14 karat *Green* gold — Gold Silver, Zinc.

These metals are placed in a crucible, melted and then cast in bars 1x3x9 inches. After casting they are annealed in annealing furnaces in preparation for the various rolling operations. The gold is usually finished to a thickness of about .016-inch which puts it in shape for the forming of solid gold cases.

The sheet metal is then ready for the blanking and forming of the various parts of the watch case by the use of presses varying in size from a very small to 250 ton pressure presses.

After being formed into shape, then they have the various parts soldered together, such as soldering movement band in the back to hold the watch movement, and the ornaments on the bezels.

The backs and bezels are then put together in preparation for the polishing operations which give the cases the very high lustre that is necessary to bring out the beautiful color of the gold. The principal details of this are the rouge brushing and buffing operations. After these operations the cases must be thoroughly cleaned so that there is not the slightest particle of dirt in the case, otherwise this would eventually get into the movement and cause improper functioning of it.

Fitting of the crystal is the last important operation in the completion of the watch case. This crystal is made from perfect crystal white glass cut from flat sheet glass, formed and ground to the proper size so as to prevent the leakage of dust to the dial of the watch.

It must be borne in mind that throughout all of these various operations, very rigid inspection is maintained to insure proper quality of the completed watch case.

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Jewelry, Tools and Jewelers' Supplies, Findings, Etc.
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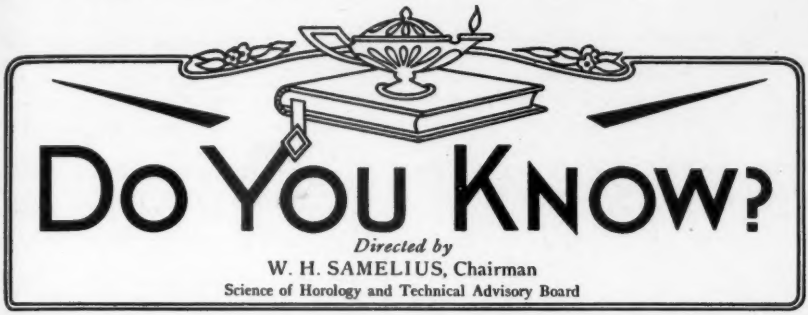

H. C. Oersted, while experimenting in his laboratory during the year 1825, discovered a new metal which was very light and tough. It was called aluminum.

Due to the tedious and expensive method of extracting this metal, aluminum sold for $545 per pound and at that time was considered a precious metal and used for jewelry and was given preference over gold and platinum.

Napoleon III made grants to carry on research for aluminum and by 1850 the cost of this precious metal was reduced to $275 per pound.

Napoleon III presented the King of Siam a watch charm which was made of aluminum. Napoleon's military uniform was decorated with aluminum buttons and breastplate.

Today our methods of producing aluminum have so improved that the metal is not considered precious but is one of our important metal industries. It is chiefly used for household utensils, machinery where light weight and strength is desired and as an alloy for steel where great strength and lightness is a factor, such as constructing airplanes, airships and many other purposes.

Platinum was first discovered by the Europeans in 1538. It was called "platina," meaning little silver. Since this metal was found in river sands along with gold, the thought was if it was replaced, letting it remain longer, it might eventually turn into gold. This metal was found by Spaniards in South America. As the metal was originally found, it was considered of no value.

One rod of steel wire, 12 inches long, will make approximately 500 small screws.

The word "Brevete" is French and means "patented," often found stamped on Swiss watches.

The first micrometer caliper for fine measurements, prototye of today's micrometer, was made and exhibited at the Paris Exposition in 1867. It was a French tool and known as "Systeme Palmer."

Any article made later than 1830 cannot be classed as an antique. The United States government made this ruling for tarrif purposes.

Chronoscope—A name or word used to denote a clock or pocket watch where the time is shown thru holes in the dial. Today it is known as a "jump dial."

The earliest clocks made by the Japanese artisans was in the early 1700's. These clocks employed a folliot or balance and in some cases, two folliots, or two time trains, one dial showing siderial time, the other dial showing local or sun time. The dial for the local time was calibrated to show the number of hours the sun shown thruout the four seasons. These clocks were all weight driven.

The invention of the chronograph or split second watch is credited to Adolphe Nicole, 1862. He was originally from Lake Joux, Switzerland. He established a business of his own in London, England, where he continued for many years.

Wisconsin Watchmakers Association

It is reported from Wisconsin Watchmakers' Association that all registered watchmakers and jewelry store owners in the state have made an ambitious attempt to raise and standardize prices. They have adopted a compiled price list through the cooperation of the watchmakers' association and the retail jewelers' association.

The state secretary's office is furnishing employment bureau service to watchmakers and employers in that state, and have already placed quite a number of men. They find it is becoming increasingly difficult to find watchmakers. They expect a real shortage of desirable watchmakers in the very near future.

The state association have set their dates for their 1938 state convention. It shall be held June 5-6 at Hotel Pfister, Milwaukee.

Membership applications continue to increase in our state.

The State Board of Examiners report several watchmakers who failed to register have been turned over to the District Attorney for prosecution. So far each has promised to refrain from repairing watches and no penalty has been imposed. The big job at the present time is checking and stopping these violators. The seven violators reported have beseeched the courts for mercy.

Appleton District Guild held a meeting November 30th, at which time it adopted constitution and by-laws.

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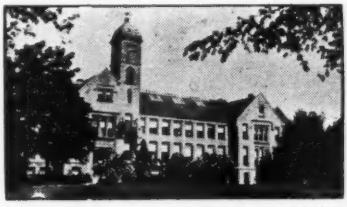
"The Pathway to Success"



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Made especially for Jewelers and Watchmakers of the Central and Southwest Territory, which we have served for 36 years.

Subscription $1.00 per Year

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Horological Guild of Spokane

The Horological Guild of Spokane held its regular monthly meeting at Wills & Redding store on the evening of December 7th. In the absence of President Lowery Rauch, the vice-president, George Overjorlie, presided. Plans for the coming season were considered, and to encourage the growth in membership a special series of lectures on adjusting was presented. The first lecture of the series will be given at the next meeting on Tuesday, January 4th. All watchmakers in Spokane and vicinity are invited to attend.

HAROLD C. KELLY,
Secretary.

Harold C. Kelly Enters Business

We learn that the Secretary of Horological Guild of Spokane has purchased an established jewelry store of that city. This store has operated continuously for more than thirty years. Mr. Kelly reports that his new venture is progressing splendidly. Mr. Kelly is widely known for his ability as a writer on horological subjects; his articles appearing regularly in THE AMERICAN HOROLOGIST and he is also the author of "Modern Methods in Watch Adjusting." We wish Mr. Kelly every success in his new venture.

Important News

Efco Manufacturing Company, manufacturers of watch cleaning machines and watch cleaning solutions, of Newark, New Jersey, have announced that they are now licensed under patents of the L & R Manufacturing Company and that all suits for infringements by the L & R Company have been withdrawn.

Improvements by Efco on their machines include a new type heater, metal jar covers, and a new basket arrangement. Full information may be obtained by writing to the Efco Manufacturing Company, 50 Columbia Street, Newark, New Jersey.

Horological Association of Massachusetts

During the regular monthly meeting in November nominations for 1938 officers took place and were duly elected at December 8th meeting held at Hotel Bellevue. The 1938 officers are: President, Col. William H. Bright; Vice President, William H. Kenyon; Treasurer, Louis Swartz; Secretary, William P. Fillebrown; Trustee, Three-year Term: John K. S. Mills; Two-year Term, C. R. Peacock. Executive Committee: Sam Freeman, T. J. Fagan, A. E. Macuen, M. Steinert, H. S. Carlstrom, W. F. Fraser, John Koski, Harry Goff, Wilfred Breau and L. F. Marcou.

Convention arrangements are making splendid progress, and it looks like a complete sell-out on display space.

The Horological Association of Virginia

The Horological Association of Virginia held a supper meeting Tuesday evening, December 7, 1937, at Brown's Restaurant, Norfolk, Va.

Five applications for membership were presented by the Chairman of the Membership Committee, and four watchmakers were elected to membership: Mr. Frank V. Sperber, Jr., Mr. Anthony V. Sansone, Mr. Morris Lerman and Mr. Clyde E. Titus of Richmond, Va.

The guest speaker of the evening was Mr. Samuel Korman of the American Perfit Crystal Corp., manufacturers of Perfit Fancy Shape and K.K. round genuine glass watch crystals. Mr. Korman gave an interesting talk about the history and method of manufacture of watch crystals.

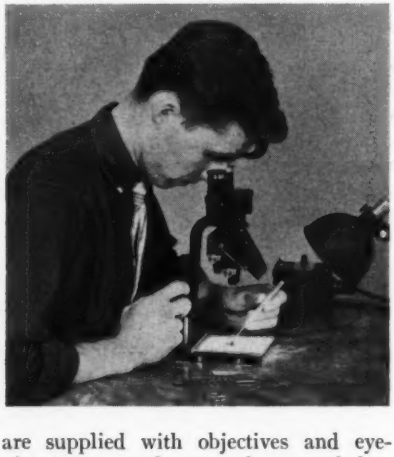
RICHARD V. BAILEY,
Secretary.

**Mention "The American Horologist"
Prove Your Appreciation**

New Binocular Microscope

A new wide field binocular microscope has just been introduced by Bausch & Lomb Optical Company to meet the need for a somewhat smaller and lighter instrument of the Greenough type.

This microscope, the Model K, is available in two forms, for either reflected or transmitted light. Both forms



are supplied with objectives and eyepieces to cover the general range of shop and school work. A special feature of the instrument is the dustproof shuttle nosepiece which carries any two pairs of objectives in parfocal position, except the O. 39X and O. 7X objectives. The full range of objectives and eyepieces is available for working magnifications of 2.34 to 150 diameters.

The body is the regular Greenough binocular type, adjustable for interpupillary distance.

The stage is equipped with removable glass insert and removable white and black metal plate. This permits proper contrast of the object under investigation. The microscope can be placed directly on the work or it can be equipped with a base carrying a fork-mounted mirror for transmitted light, and a pair of arm rests to steady the hands while working on the specimen.

The instrument is useful for all low power work.

L & R Reports Record Year

In the face of such discouraging reports as have been filling the business columns of the press recently, it is encouraging indeed to receive one such as the following sent us by the L & R Manufacturing Company of Newark, N. J.

"More machines . . . more solutions sold this year than in any of the seven previous years during which this company has been operating. More watchmakers have realized that the electric watch cleaning machine is not a gadget, but an important piece of equipment necessary in keeping their shops up-to-date."

In addition, L & R reports that export sales have increased steadily since the introduction of the L & R machines in England earlier this year. Their British sales office, Anglo-American Products, Ltd., reports an ever growing series of inquiries and orders from all parts of the British Empire and the European continent.

A new 16-page, pocket-size catalog of L & R products has just been printed and will be sent to those interested watchmakers who write to L & R Manufacturing Co., 54 Clinton St., Newark, N. J., mentioning this publication.

How to Tell Time in the Dark

(Continued from Page 6)

exact time, but you can generally get within a quarter of an hour of it."

"Wouldn't the same rule hold good for a clock or a watch which is wound with a key?"

"I dare say it would, but I never tried it on anything except a stem-winding watch. I know a blind man who always tells time by winding his watch and counting the ticks. His sense of touch is quite delicate, and he can wind up his watch three or four times a day and then calculate within ten minutes of the correct time."

Helpful Books for the Horologist

Send Orders to THE AMERICAN HOROLOGIST, 3226 E. Colfax Ave., Denver, Colo.

The Watchmaker's Handbook

By Claudius Saunier. Translated from the French of Claudius Saunier, and enlarged by Julien Tripplin, F.R.A.S., and Edward Rigg, M.A. Over 500 pages. New eighth edition. 14 folding plates. **Price, $5.00**

Horology—The Science of Time Measurement and the Construction of Clocks, Watches and Chronometers.

By Eric Haswell, F.P.H.I. This book is one of the best yet produced on this subject. The author has explained the principles of operation and the constructional details of clocks, watches and chronometers. 267 pages. **Price, $7.00**

Watch Repairing, Cleaning and Adjusting.

By F. J. Garrard. Covers the Cleaning and Repairing of Watches. Treats on the materials and tools used. 214 pages. Ninth edition. Illustrated by over 200 engravings. Price, **$3.00**

Watch and Clock Makers' Manual.

By F. W. Britten. This book covers a large scope of practical repair work and embraces every type of watch from the early English Fusee to the modern wrist watch.

The use of the lathe and attachments is given thorough treatment. 361 pages, 150 illustrations. **Price, $3.00**

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Clockmaking—Past and Present.

By C. F. C. Gordon. With which is incorporated the more important portion of "Clocks, Watches, and Bells," by the late Lord Grimthorpe, relating to Turret Clocks and Gravity Escapements. By G. F. C. Gordon, M.A., A.M.I.C.E. A practical book of special interest to the Clockmaker and Repairer. 232 pages. Fully illustrated by diagrams and plates. **Price, $5.00**

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Trade Work — Send your surplus watchwork to G. Olivier, 27703 Gratiot, Roseville, Michigan. 3 Day Service—Guaranteed work. We repair all makes and grades.

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If you have any books on Horology which are out of print or are of such subjects the Watchmaker and Toolmakers would be interested please send description, condition and price wanted, will consider complete Horological Libraries. Address THE AMERICAN HOROLOGIST, Box No. 46.

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For Sale: New two slide swivel slide rest, workmanship highest quality, $38.00. Also specializing in special hand tools and chucks. H. E. Reum, 429 Roslyn Place, Chicago, Ill.

WANTED

Wanted: Copy of **Analysis of The Lever Escapement** by Playtner. Give price and condition. Address THE AMERICAN HOROLOGIST.

Books and Tools.—Copies of "The Watch Adjuster's Manual" by Excelsior. Jacket lathes, one Culman poising and pivot truing caliper. Address The American Horologist, Box No. 51.

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Working drawings for construction of wooden Columbus Clock consisting of a set of 15 blueprints for $3.25 postpaid. Address THE AMERICAN HOROLOGIST.

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Can anyone tell us where information can be secured regarding THE AMERICAN HOROLOGICAL SOCIETY. This society was active in 1903. Offices in Chicago, Ill., and at that time Mr. C. L. Hoefer, 103 State Street, was secretary. Please send any information you may have or know of to National Headquarters, U. H. A. A.

Exchange Department

A new service to our readers without obligation. Many readers have written to us asking if we knew where they could trade some article for other articles. You may send in a list of tools, materials, books, etc., setting forth condition and what you want or need, which will be listed, and we notify you of sources of exchange without obligation or cost.

Store For Sale

Jewelery and optical store, northeastern section of Oklahoma, established 24 years, never conducted a sale, highest of ethics governed the business. Store will pay for itself in four to six months. Is a three-man store. Fixtures and stock about $4,500. Address Box No. 49. THE AMERICAN HOROLOGIST.

Mention "The American Horologist"

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ARE ECONOMICAL AND TIME SAVING!

Prudent Watchmakers no longer buy hands they cannot use.

Our 6 C Hand Assortment consists of 48 different hour and minute hands for every movement from 3-10L, including A. S., Bulova, Gruen and Longines. One pair each of hour and minute, Blue and Gilt Index hands.

Each hand is metrically gauged with 6 different hole sizes for each length. They require no broaching.

You need only carry a small stock of hands to find the one to meet your requirements.

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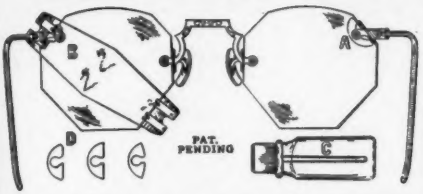

CAPITALIZE on this Immediate Service

With this simple little outfit you can repair rimless spectacles quickly and easily. Your customer will joyfully appreciate this service.

Kit contains Clamp "B" for holding broken parts in position. Cement "C" for cementing wafers to lens and 20 pairs of transparent Wafers "D" assorted styles enough for 20 jobs.

Your coustomer can use old lens while waiting for new one

Does not interfere with sales. Helps your customer while new lens is being made. Simple directions with each outfit.

No. 6221N. Outfit complete as described to left..... **$1.50**

Extra wafers per 10 pair.....35c

Instant Relief for Sore NOSES and EARS

Nose comfort and ear comfort

Fits like a soft glove over the spectacle pad, and the end of temple, giving immediate relief to the wearer.

Soft Flesh-Colored Rubber

Nose Comfort

No. 6199N. Per doz. pair..... **$1.65**

Ear Comfort

Assorted Diameters for All Sizes

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OWNERS OF PAULSON TIME MICROMETER look forward to 1938 with entire confidence. Owners of Paulson Time Micrometers know from past experience that watch owners and watch purchasers favor jewelers using this scientific instrument.

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Use This Handy Order Blank

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Please Send Following As Checked.

- ☐ Doz. No. 6199N Nose Comfort. $1.65.
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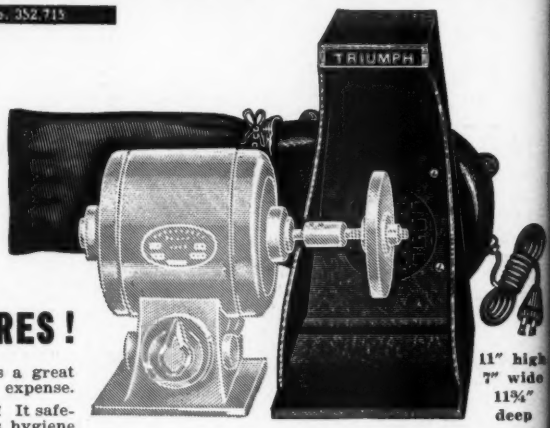

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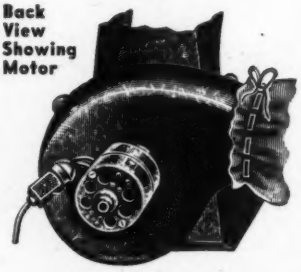
3 BIG FEATURES!

LOW PRICE! It affords a great saving in your overhead expense.

HEALTH PROTECTION! It safeguards health and provides hygiene and sanitation. Some states make dust collectors compulsory by law. This shows how important a health factor it really is.

SOURCE OF INCOME! The gold and other precious metals collected will soon pay for the outfit—after that it becomes a source of continued profit.



Back View Showing Motor

The Last Word in ECONOMY, DESIGN and SIMPLICITY

Entirely different. Employs a rotary suction blower. Use it anywhere — with any motor on any bench. Occupies only about ½ cubic foot. No need to move your present motor; simply set dust collector alongside of it. Its hood completely shields your wheel or buff and the bag arrangement is out of the way. Scientifically and rigidly constructed. Housing of black crackle finished metal; ship. wt. 19 lbs. On-and-off switch conveniently located at suction motor (see back view). Suction motor is powerful and well constructed, requires no attention except for occasional oiling. Economical to operate.

No. 5253009. Triumph Dust Collector, complete with two dust bags, 6 ft. extension cord and plug... **$19.95**

Less 3%

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